A CUMACEAN NEW TO SOUTH AUSTRALIA

By HERBERT M. HALE, Director, South Australian Museum.

Fig. 1.

Cyclaspis usitata sp. nov.

Female. Integument hard. Carapace a little less than one-third total length of body, its depth more than half its length; surface with numerous pits (producing a somewhat reticulated appearance), and with two transverse ridges, not exceedingly strong, but quite distinct; dorsum with a median longitudinal ridge. Pseudorostral lobes reaching almost to apex of narrow eye-lobe, which bears three lenses. Antennal notch well marked, and antennal tooth rather wide and subacute. First transverse ridge at about first fourth of length of carapace, running down on each side across a low tumidity, and ending a short distance beyond, not extending nearly to lower margin; second transverse ridge behind middle of length of carapace, on each side curving upwards almost perpendicularly from the lower margin, and ending abruptly in a tiny angular projection before reaching the median dorsal keel. Posterior end of carapace with a median dorsal elevation. Dorsum of second pedigerous segment elevated medianly; exposed median dorsal portions of third and fourth pedigerous segments very short, that of the fourth carinate; fifth pedigerous segment also weakly keeled dorsally, the carina ending posteriorly in a small point, and with a similar lateral carina on each side. Each pleon segment with an obsolete median dorsal ridge and infero-lateral ridges; anterior four segments with oblique dorso-lateral ridges, and the first five with lateral articular processes. Basis of third maxillipeds almost parallel-sided for greater part of length, and produced apically to middle of length of merus, which is produced practically to level of apex of carpus. Carpus of first leg extending nearly to antennal tooth; basis narrowed on distal half, with no marked apical process, and one-seventh as long again as rest of limb; ischium more than half as long as merus, which is considerably shorter than carpus; propodus longer than carpus, which is a little longer than dactylus. Ischium of second to fifth peraeopods short; merus longer than carpus in second, and shorter than, or equal to, carpus in remaining legs. Uropods twice as long as last pleon segment, with the peduncle as long as the rami, which are subequal in length, with the apical half of the inner edges finely serrate.

Colour pale yellow, nearly white, with dark sooty markings on carapace and pedigerous segments.

Length, 10 mm.

Loc. South Australia: Off Outer Harbour, St. Vincent Gulf (B. C. Cotton). Type, female (in S. Aust. Mus., Reg. No. C. 1841).

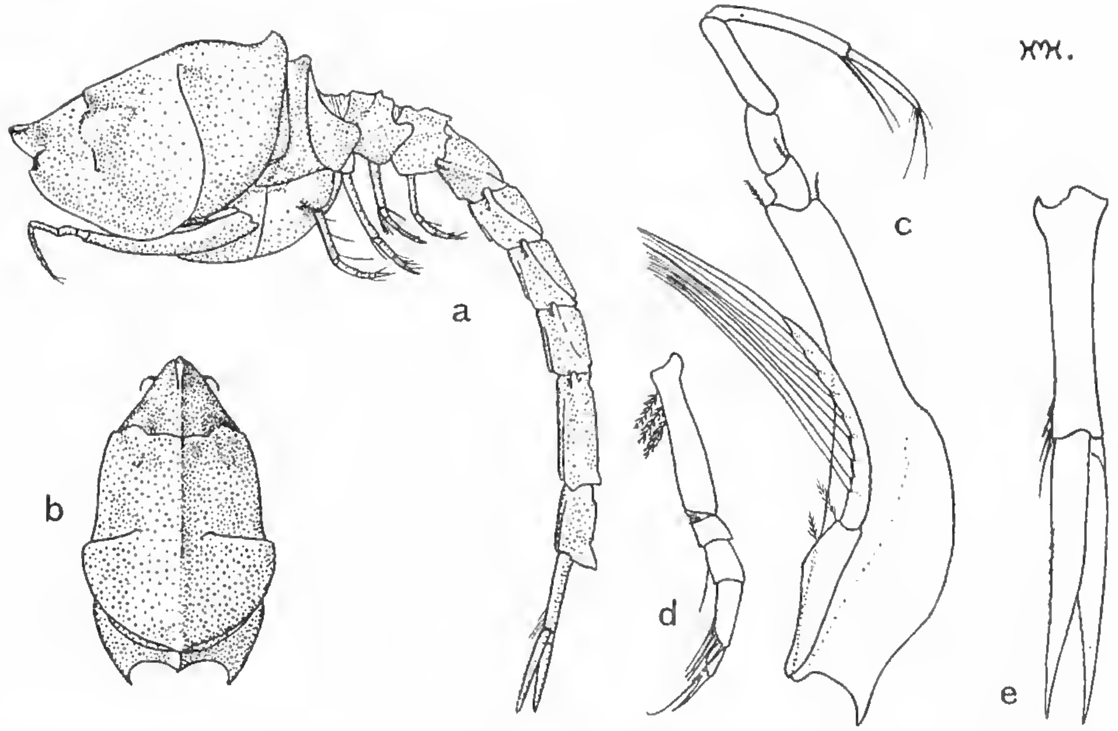

Fig. 1. *Cyclaspis usitata*, type female; a, lateral view (× 9); b, dorsal view of cephalothorax (× 9); c, first leg (× 36); d, fifth leg (× 36); e, uropod (× 36).

This species resembles *C. australis* Sars in some respects, but has no trace of a ridge leading backwards from the antennal notch, while the posterior lateral ridge ends abruptly below the dorsal ridge; the hinder margin of the carapace has a marked dorsal elevation, etc.; the legs are much as in *C. australis*, but the segments of the first antennae are of different proportions.

The holotype of *C. candida* Zimmer, from North-Western Australia, is a male, and the specimen described above may be the female of that species, as its appearance rather strongly suggests. The ridges of the carapace and pleon of the South Australian specimen differ somewhat in disposition; the carapace as seen from above is widest immediately behind the second pair of transverse ridges (instead of at the first ridge), and as there are also other slighter differences I have provisionally described it as new.

THE CICINDELIDAE (COLEOPTERA) OF THE MOUNT LAMINGTON PLATEAU IN NORTH-EAST PAPUA

BY WALTER HORN, BERLIN-DAHLEM

Summary

In the following I give a list of the Cincindelidae which have been collected by Mr. C. T. McNamara in the Lamington Mountains, New Guinea, at an elevation of 1,300-1,500 feet. The material was communicated to me by the South Australian Museum.

1. **Caledonica Jordani** W. Horn
2. **Cicindela Semicincta** Brulle
3. **Cicindela Funerata** Boisduval

This is aberrant, and is a form intermediate between the typical C. funerata as described by Boisduval and the subspecies barbata W. Horn.

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2. Cicindela semicincta Brulle.

3. Cicindela funerata Boisduval.

This is aberrant, and is a form intermediate between the typical *C. funerata* as described by Boisduval and the subspecies *barbata* W. Horn.

4. Cicindela bennigsenia W. Horn.

Fig. 1.

The labrum of my two type males is scarcely, if at all, excavated in the middle, and shows only a minute sagittal tooth. The labrum of the male specimens collected by Mr. McNamara show this emargination of the labrum very much more strongly developed, but without the slightest trace of sagittal tooth. The pronotum of the females collected by him shows, just before the basal sulcus in the sagittal line, the same very characteristic small rounded (prominent backward) protuberance noted in my original description. The aedeagus is shown in fig. 1a and 1b. The small constriction before its last third seems to be remarkable, still more the very minute lateral tooth just before its tip. Length, 6·25–7·75 mm. (without labrum).

5. Cicindela io micro-gemmea W. Horn, subsp. nov.

Fig. 2.

♀ ♂ Differt a forma prioritatis capite thoraceque aeneo-metallicis, hinc inde subvirescentibus (non coeruleis); pronotho mas. paullo angustiore, fem. basaliter magis angustato angulisque basalibus multo minus tuberoso-prominetibus;

elytris obscure aeneis subnitentibus, prope marginem (in modo interrupto) viridi-coeruleo tinctis, punctis duo humeralibus in forma lunulae conclusis, gemmis illis magnis coeruleis subsuturalibus multo minoribus viridescentibusque; corpore subtus paullo minus viridi-coeruleo-induto. Labro mas. et fem. longiore, dente sagittali fem. paullo breviore. Long 5·5–6·0 mm. (sine labro).

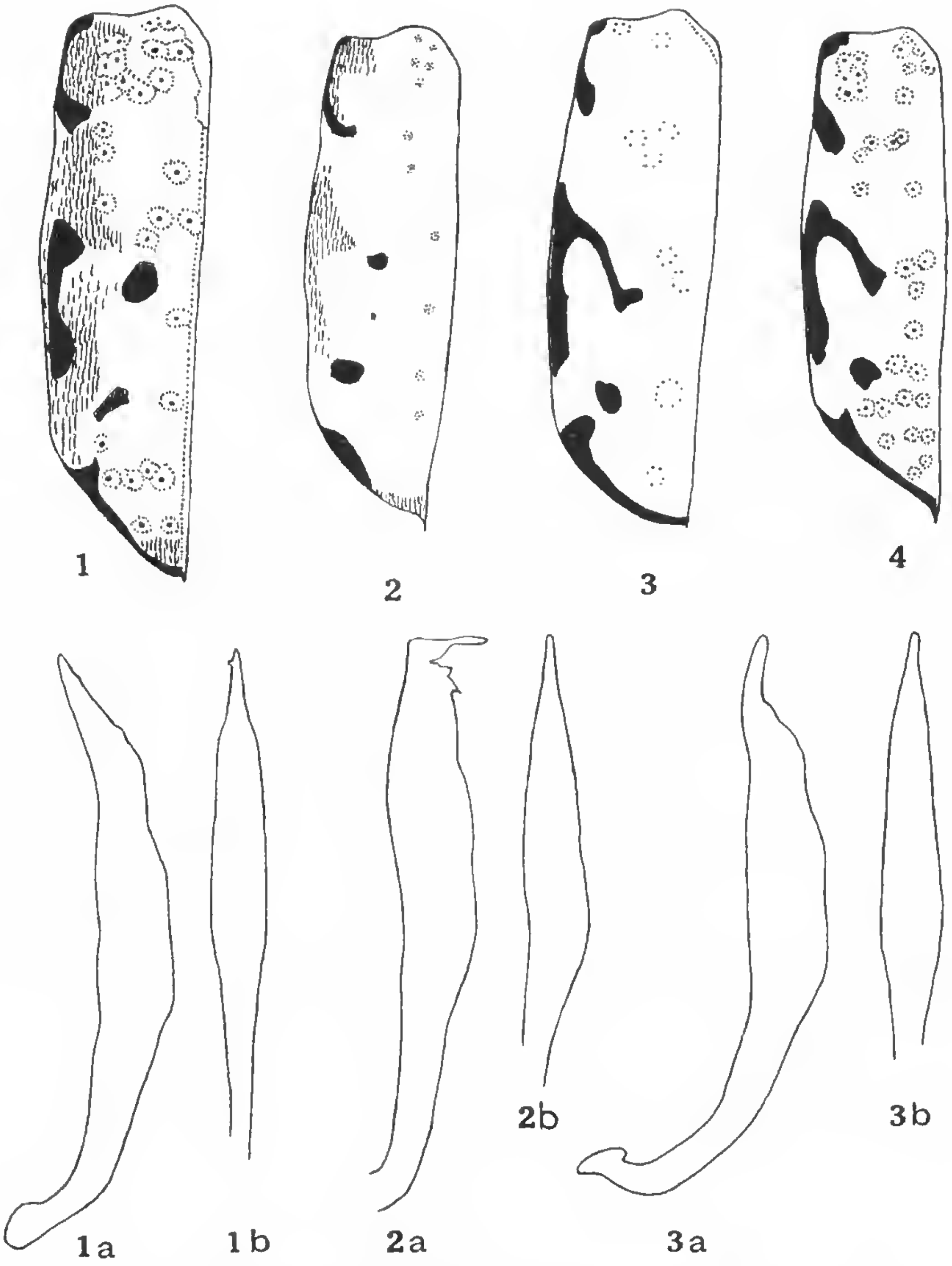


Fig. 1–4. 1, Elytron of *Cicindela bennigsenia* W. Horn; 1a and b, aedeagus. 2, Elytron of *C. io microgemmea* W. Horn; 2a and b, aedeagus. 3, Elytron of *C. guineensis umbrosa* W. Horn; 3a and b, aedeagus. 4, Elytron of *C. guineensis* W. Horn.

The tip of the aedeagus has a very peculiar shape, as will be seen from the figures 2a and 2b. The very fine hook at the tip is almost vertically bent off from the stem. The basal part of the humeral lunula shows (as also often the humeral spot of the typical *C. io*) a reddish colouration. The border of the elytra is of a bluish colouration, especially within the humeral lunula and at the middle part of its length; the fourth sternite of the abdomen in the female is strongly enlarged, and shows in the median line a triangular spot of yellow.

6. CICINDELA GUINEENSIS UMBROSA W. Horn, subsp. nov.

Fig. 3.

♀ ♂ Differt a forma prioritatis toto corpore, 4 primis antennarum articulis, pedibus nigro-aeneis; elytris opacis fere nigricantibus; coloribus illis aut viridibus aut violaceis aut rufo-brunnescentibus deficientibus (gemmis fere totis obsoletis). Long 5·75–6·25 mm. (sine labro).

The upper and under side of the whole body, the four first articles of the antennae, and the legs are of a dark brassy hue. The elytra are almost black without any shine, and only show here and there small traces of the large foveols (the last ones seem to be even less conspicuous, as they do not show any contrasted colouration against the general surface of the elytra, such as they do in the typical *C. guineensis*). The aedeagus is long and fine, and bears a very strong constriction at its termination (fig. 3a and 3b).

There is only one specimen in the series which proves to be an intermediate form between this new race and the typical *C. guineensis*. This specimen shows much smaller foveols on the elytra, but the remaining foveols possess the contrasted colouration of the typical form. Fig. 4 shows the typical *C. guineensis* W. Horn.

THE HENBURY (CENTRAL AUSTRALIA) METEORIC IRON

By A. R. Alderman, M.Sc., F.G.S.

Summary

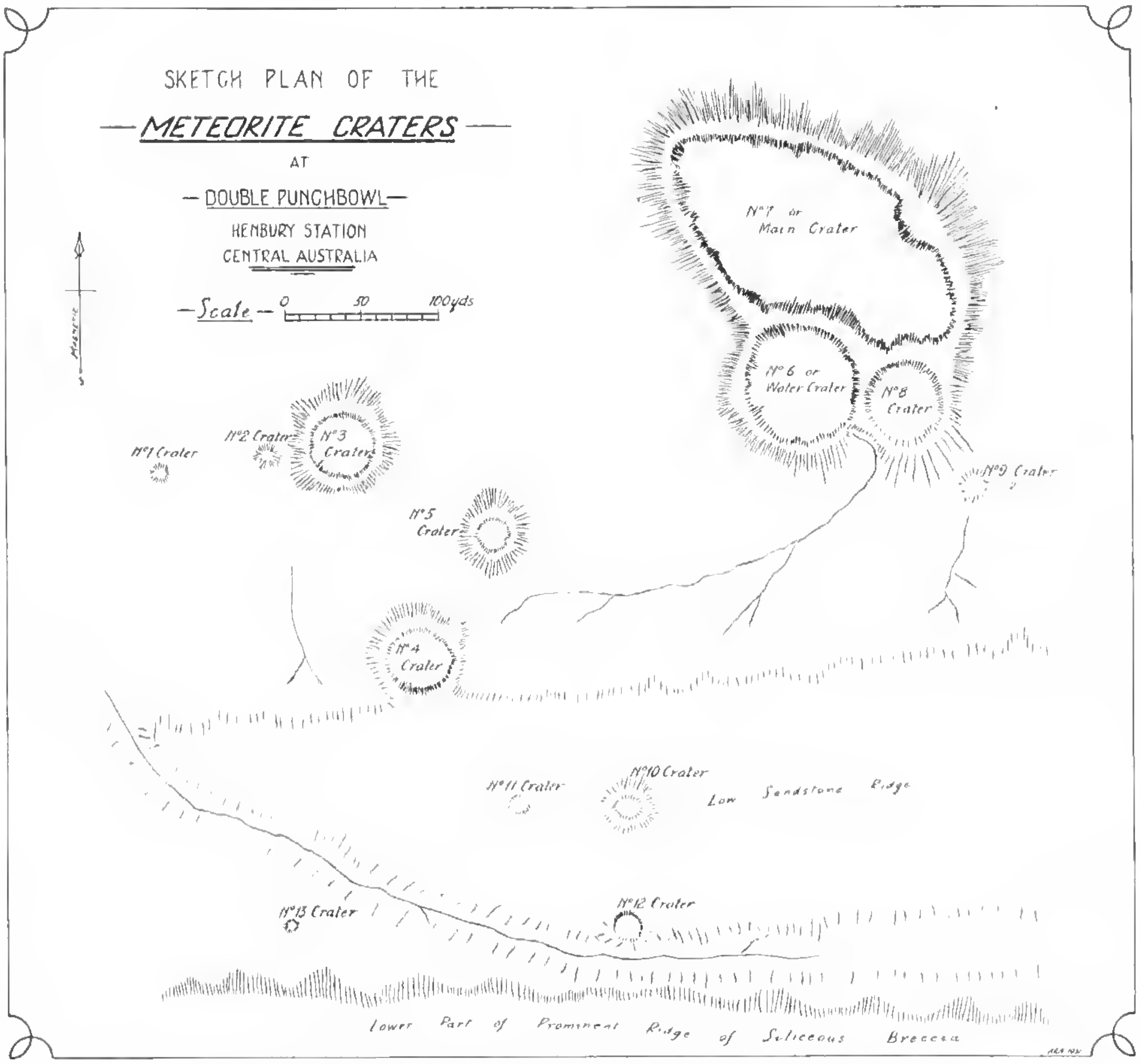
The occurrence of meteoric iron near Henbury, in Central Australia, has already been described by the writer ([1]), who noted that the meteoric material occurred in the form of numerous scattered fragments of iron surrounding some twelve or thirteen "craters" (fig. 1). Since the writer's visit to the locality in May, 1931, hundreds – possibly thousands – of specimens have been removed from the site by unauthorized collectors, so that much valuable information concerning the distribution, etc., has been permanently lost.

THE HENBURY (CENTRAL AUSTRALIA) METEORIC IRON

By A. R. ALDERMAN, M.Sc., F.G.S.

Fig. 1-9.

THE occurrence of meteoric iron near Henbury, in Central Australia, has already been described by the writer (¹), who noted that the meteoric material occurred in the form of numerous scattered fragments of iron surrounding some twelve or thirteen "craters" (fig. 1).



(¹) Alderman, Mineralogical Magazine, March, 1932, Vol. xxiii, No. 136, pp. 19-32.

Since the writer's visit to the locality in May, 1931, hundreds—possibly thousands—of specimens have been removed from the site by unauthorized collectors, so that much valuable information concerning the distribution, etc., has been permanently lost.

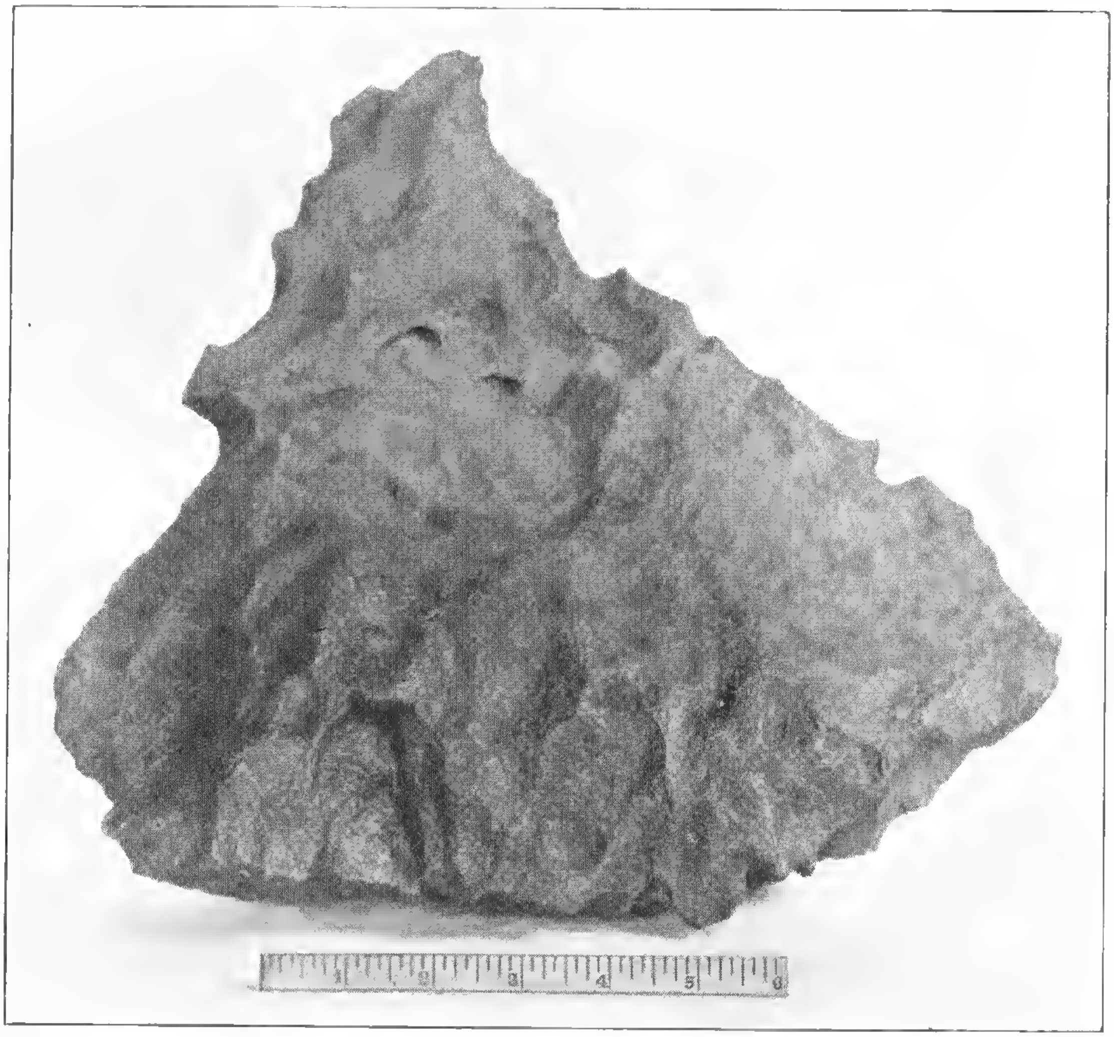


Fig. 2. Specimen of meteoric iron weighing 52½ lb. When found the darker area in the foreground was exposed to the air, the lighter portion being buried.

As far as the author is aware, all the material as yet removed from the Henbury area has been found on the surface, and no attempt has yet been made to excavate any of the craters. It is highly desirable that geophysical tests be made before any excavation work is attempted. The considerable cost of a thoroughly adequate investigation of this nature has so far deferred operations contemplated by members of the South Australian Museum and Adelaide University staffs.

The object of the present paper is to describe the nature of the meteoric iron itself. During the author's visit to the locality in 1931 more than 800 meteoric fragments were collected for the South Australian Museum. The total weight of these specimens was about 500 lb., the largest weighing 52½ lb. (fig. 2). Mr. R. Bedford, of Kyancutta, subsequently visited Henbury, and found one specimen weighing 170 lb., removing in all about 510 specimens, which aggregated 321 lb. weight. The South Australian Museum has since purchased pieces, weighing 59 lb., 31 lb., and 20 lb., from a prospector. Also there is some evidence to hand that further quantities of meteoric iron have recently been removed from the locality.

Fig. 3. Twisted fragment of iron weighing 13 lb., found inside crater No. 3.

METEORIC IRON SPECIMENS.

In shape, some of the pieces, particularly the larger ones, resemble entire meteorites, whereas in many others the shape suggests that they have been torn or shattered from large masses. Many small fragments are twisted and bent into unusual shapes (fig. 3 and 4); some of them are thin and flaky, while many others are biconvex. The external form, and also the internal structure, of a very large proportion of the specimens shows that distortion and shattering has taken place. Presumably this happened at the time of fall. The fact that large craters were formed by the impact of the meteorites, and that the heat so generated was sufficient to fuse the country rock, indicates that an unusually great force was pent up in the meteoric bodies (fig. 5). The force of impact was evidently sufficient to shatter and distort the meteoritic masses.

The evidence appears to indicate that the Henbury material fell as a meteoric shower, in which were included many small fragments of iron and some very large ones. The craters were formed by the impact of the larger masses, which at the same time were intensely shattered, and from which thousands of small fragments were torn and scattered. The fantastically twisted and jagged form of so many of the fragments must be seen to be believed, and it appears difficult to account for them, save by a disruption of the larger masses at the time of impact.

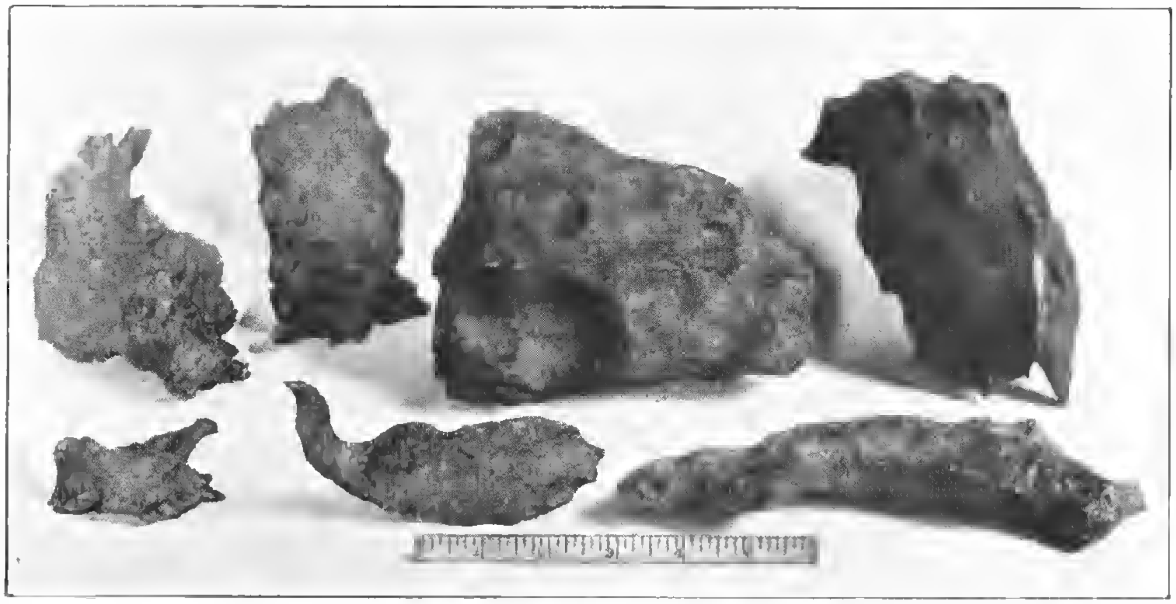


Fig. 4. Typical specimens of Henbury meteoric iron.

A numerically smaller number of pieces seem to have fallen as separate members of the meteoric shower. These show no signs of disruption, and are generally larger than the twisted fragments described above. They display broad indentations and thumb-marks and the internal structure is normal. The iron is fairly soft and easy to work. It is also very resistant to atmospheric oxidation. A number of fragments were cut, polished, and etched. The etching was effected with dilute nitric acid (4 per cent.), the best results being obtained after a treatment of about two minutes. As noted by Dr. L. J. Spencer (²), the

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(²) Alderman, *loc. cit.*, Addendum by L. J. Spencer, p. 31.

etched iron shows well-marked Widmanstatten figures, and "besides kamacite, taenite, and plessite, there are a few minute specks of troilite." Such troilite may be seen in most polished sections, but in one large section examined by the author a distinct vein of that mineral is very prominent, and is associated with a small amount of lawrencite (fig. 6). The average width of the kamacite bands varies from one specimen to another, in some averaging 1 mm., in others 1½ mm. The width of these bands depends, of course, on the direction in which the section is cut.

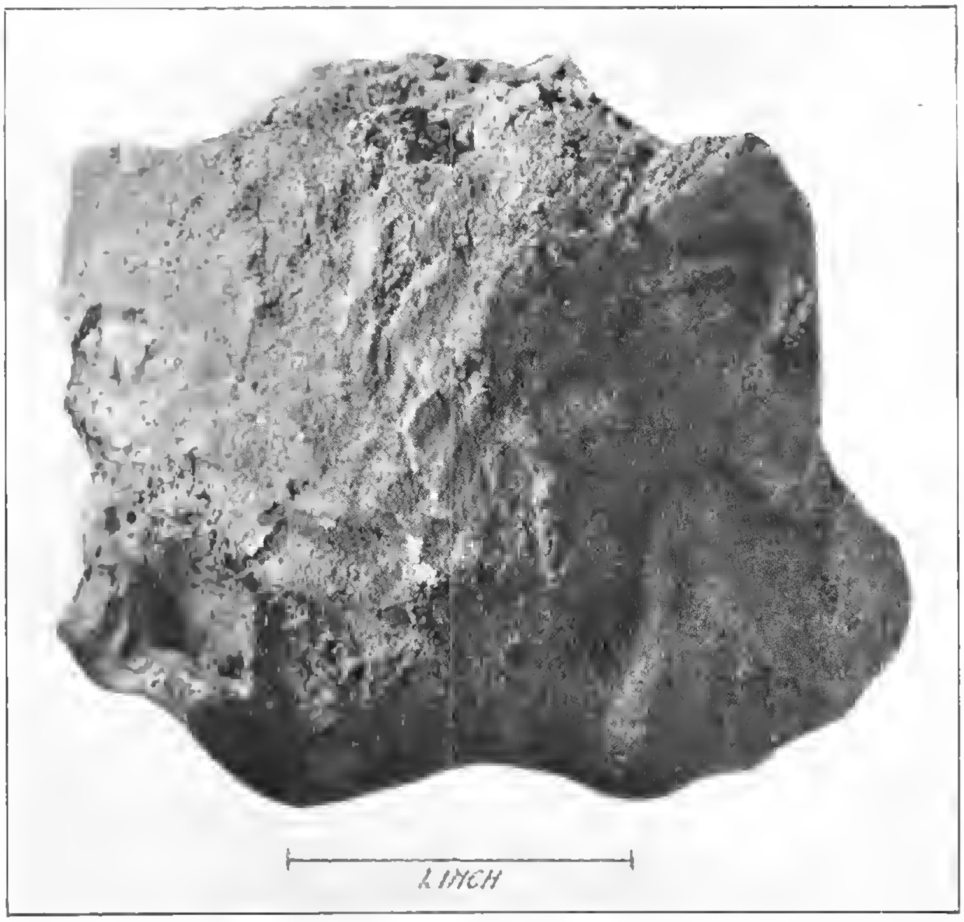

Fig. 5. Fused sandstone. The upper left portion of the specimen is reddish and sandy. The darker part of the specimen is black vesicular glass.

The iron may therefore be classed as a medium or coarse-medium octahedrite. Dr. Spencer has remarked on the wavy and cracked nature of the kamacite bands. Some etched specimens show what appear to be closed cracks reaching from one side of the specimen to the other (fig. 7). Such phenomena of strain and disruption are in accordance with the evidence of shattering of the original masses as indicated by the torn and twisted form of so many of the smaller fragments. The fine striations known as "Neumann lines" are observable in many of the kamacite bands.

CHEMICAL EXAMINATION.

Material for analysis by the author was obtained from a selected specimen by drilling. Attempts were made to estimate iron gravimetrically after four or five precipitations with ammonia. Results from this method were, however, obviously high. It was eventually estimated by titration with permanganate. Nickel was precipitated and weighed as Ni-dimethylglyoxime, and cobalt was estimated by the α-nitroso-β-naphthol method. Careful determinations of carbon were very kindly made for the author by Mr. T. W. Dalwood, of the Assay Department, South Australian School of Mines. The results thus obtained are as follows:

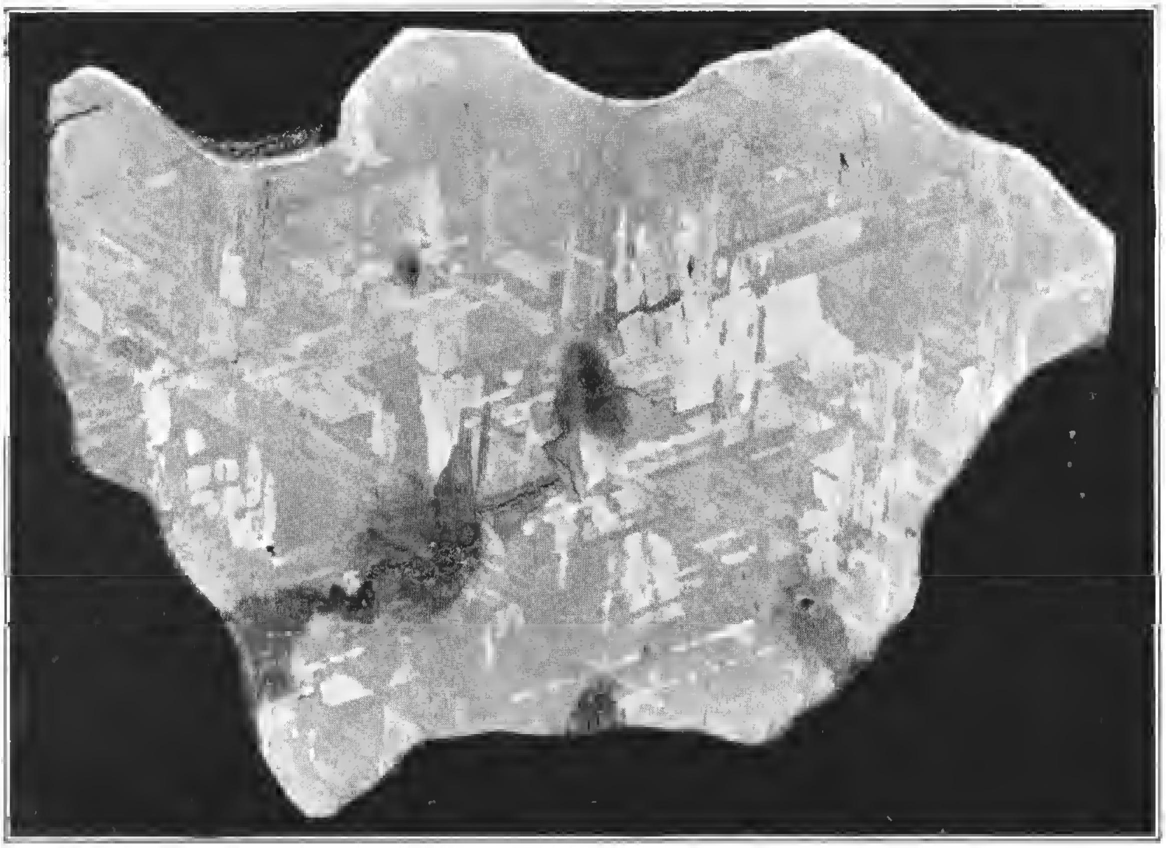

Fig. 6. Etched section showing Widmanstatten figures. The thin black vein consists of troilite with some lawrencite. This vein is seen to follow the edges of the kamacite bands. (Nat. size.)

Fe	91·54 per cent.
Ni	7·54 „ „
Co	0·37 „ „
S	0·01 „ „
P	0·08 „ „
C	0·013 „ „
SiO_2	0·03 „ „
Total	99·58 per cent.

The Fe : Ni ratio is thus 12·1. This figure agrees with Dr. G. T. Prior's grouping for a medium octahedrite. The specific gravity, as determined by the pycnometer method, using benzene, is 7·53.

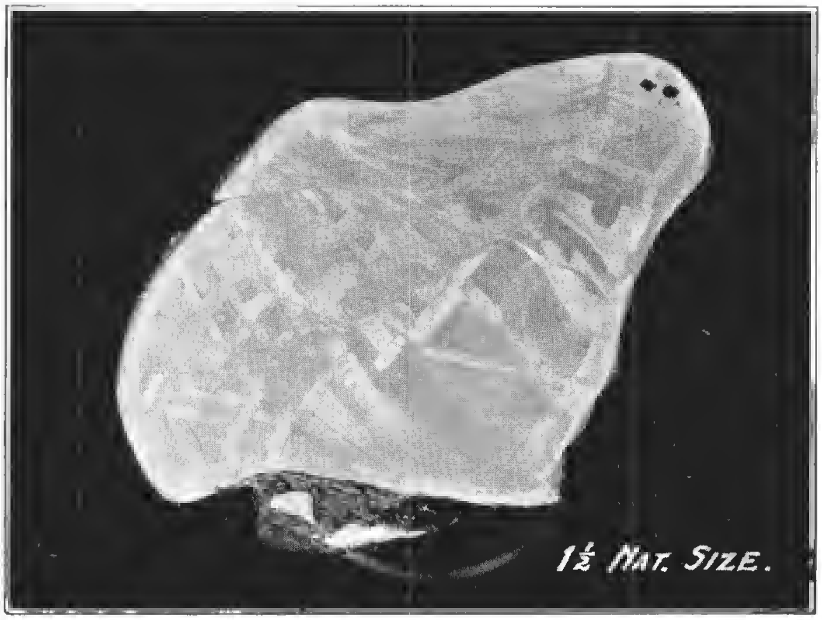

Fig. 7. Etched section of the iron showing the wavy nature of the kamacite bands. Several long, closed cracks may also be seen.

A number of small separate fragments of the iron have been forwarded to Professor F. Paneth, of Konigsberg University, who has undertaken the determination of the helium content, from which an estimate of the age of the meteorite can be obtained.

IRON-SHALE.

A partial analysis was also made by the author of the so-called "iron-shale." This greatly resembles the "iron-shale" found near Canyon Diablo, Arizona.

It is brown to dark-brown in colour, and is magnetic. It appears to consist very largely of limonite and to have been formed from the nickel-iron by weathering. Many specimens show a laminated appearance suggestive of progressive stages in the oxidizing process (fig. 8); others possess the roughly biconvex shape which is typical of so many of the iron fragments (fig. 9). Stains suggestive of nickel may be seen on some specimens. Chemical analysis gave the following results:

Total Iron (as Fe_2O_3)	83·31	per cent.
NiO	5·76	,, ,,
SiO_2	0·53	,, ,,
H_2O	9·15	,, ,,

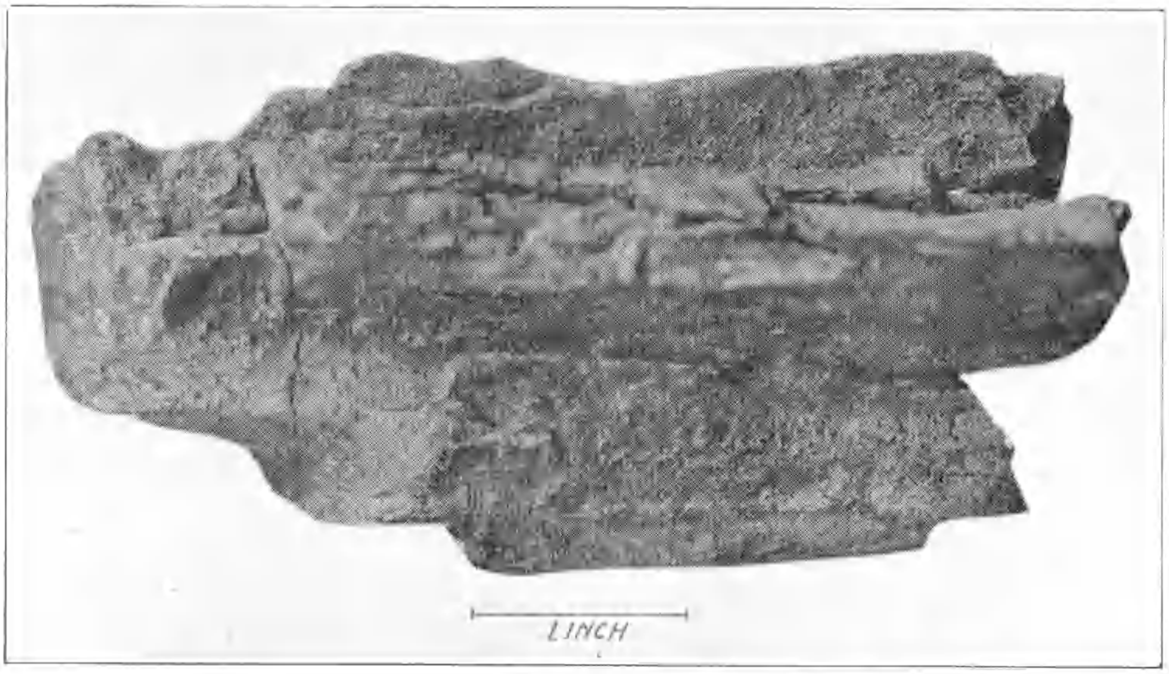

Fig. 8. Laminated "iron-shale."

It is interesting to record that all the iron-shale which the author has examined was found on the crater walls. Mr. Bedford, who found the actual specimen which the author selected for analysis, confirms this statement. From this it seems probable that such material had been buried in the débris of the crater walls until recently, when it was uncovered for the first time. It would appear, therefore, that meteoric iron which is buried below soil and fine fragmentary material would be oxidized more readily into the solid iron shale form than would similar material which is exposed to the air. Oxidized matter would be removed from exposed iron by such agencies as wind and moving water, and in the case of buried iron would probably be retained *in situ* by the enclosing soil, etc. In a climate as arid as that of the Henbury region (where the average rainfall is about 6 inches per annum), rock exposed to the air dries immediately after the short spells of rain, most of which falls as thunder-showers. The author has described, however, how the craters form natural reservoirs, into which water is concentrated after rain (³). This would surely keep much of the wall material in a state of dampness for a not inconsiderable time after rain.

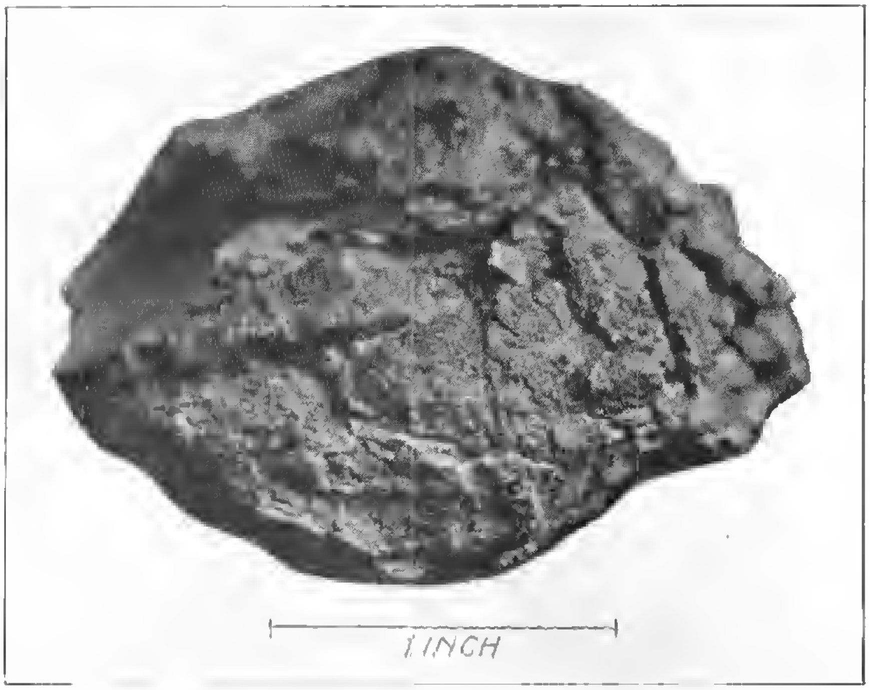

Fig. 9. "Iron-shale" showing typical bi-convex shape.

One can imagine, therefore, that oxidation would take place more readily in iron which was buried in such a favoured position in the crater walls, and also that the oxidized material would, after its formation, be preserved *in situ*. The oxidation would, of course, proceed much more rapidly if minerals such as lawrencite were present. This mineral was noted in one specimen of the iron examined by the author, but not in any of the numerous other sections. The presence of half a per cent. of silica in the shale indicates that the widespread silicification so noticeable in Central Australia has not been without its effect even on this meteoric material.

Iron-shale similar to that found at Henbury and Canyon Diablo has been recorded from the crater at Odessa (Texas) and near Grootfontein (South-West Africa), in which latter locality it forms an enveloping zone around the giant Hoba meteorite.

(³) Alderman, *loc. cit.*, p. 22.

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